Application No.: 10/797,361 Docket No.: 09650/0200850-US0

Amendment dated June 26, 2008

Reply to Non-Final Office Action of March 26, 2008

REMARKS

Reconsideration of the application is respectfully requested.

I. Status of the Claims

Claims 1-5 and 7 are pending in the application.

Claim 6 is cancelled herein without prejudice or disclaimer.

Claims 1 and 7 are amended. No new matter is added.

II. Claim rejection-35 U.S.C. §103

The rejection of claim 1 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida

et al., (U.S. Patent No. 5,854,847) in view of Thigpen (Pub. No. 2004/0109575) is traversed.

Applicant's invention is directed to a speaker apparatus for use in an automobile

where the speaker apparatus comprises an L channel cone type speaker, an R channel cone

 $\underline{type}$  speaker, and a center  $\underline{cone\ type}$  speaker placed between and  $\underline{in\ close\ proximity}$  to the L

channel speaker and the R channel speaker. The center speaker produces a -L channel signal

(a signal having a reverse or opposite phase) and a -R channel signal (a signal having a

reverse or opposite phase). The center speaker is mounted forward of a driver and passenger

seat and is placed in the center of the width direction of the automobile. The L channel

speaker and the R channel speaker are placed on either side of the center speaker and in close

proximity to the center speaker. Each speaker is a cone type speaker.

The vibration axis of the L channel speaker, in the horizontal direction is in a

counterclockwise direction from the direction of motion of the automobile and the vertical

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axis is at a prescribed angle inclined in the direction of motion of the automobile to intersect

with and reflect sound from the front glass.

The vibration axis of the R channel speaker, in the horizontal direction is in a

clockwise from the direction of motion of the automobile and in the vertical axis is at a

prescribed angle inclined in the direction of motion of the automobile to intersects and

reflect sound from the front glass.

The horizontal vibration axis of the center speaker is parallel to the direction of

motion of the automobile and in the vertical direction it intersects with the front glass of the

automobile.

Referring to Figures 3 and 4 in the application, the left and right cone type speakers

are each oriented in at prescribed angles in both the vertical and horizontal axes. In one

embodiment, the right speaker is set to have a horizontal vibration axis which is set at an

angle of 48 degrees clockwise in the direction of motion of the automobile, and a vertical

vibration axis of 65 degrees from the vertical axis toward the front of the automobile. The

left speaker is set to have a horizontal vibration axis which is set at an angle of 48 degrees

counterclockwise in the direction of motion of the automobile, and a vertical vibration axis of

65 degrees from the vertical axis toward the front of the automobile. Thus, each speaker is

oriented in two direction, one direction being relative to the vertical plane and the other being

relative to the horizontal plane.

Referring to Fig. 5 in the application, L channel speaker radiates left channel sound

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and R channel speaker radiates right channel sound. The center speaker radiates a signal

having a reverse phase of the L (left) channel speaker and a reverse phase of the R (right)

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channel speaker. In the application the reverse phase is designated by a minus sign.

The left channel reverse phase signal (the minus L signal) from the center speaker

cancels out more of the L channel signal at the right ear of a person sitting in the left seat of

an automobile than at the left ear of that person. Thus, there is a difference in signal levels in

the areas near the right and left ears of the person in the left seat of the automobile. As a

result, the sound image of the L channel is identified as being near the front left side of the

person in the left seat. A similar result is obtained with the person in the right seat of the

automobile. The art of record neither discloses nor suggests doing what is disclosed in the

application and now positively recited in claim 1...

Yoshida discloses an automobile having two side speakers and a central speaker

where a delay circuit is coupled to the side speakers so that the sound signals emitted from

each side speaker is delayed relative to the sound from the central speaker. In this way the

sound from the central speaker is emitted at an earlier time than the sound signals from the

side speakers. Referring to Yoshida, col. 4, lines 12-22, "...as a result, for the listeners it

seems as if the two side speakers are disposed further away than the central

speaker...(and)...for the listeners it seems as if there is only one sound source."

(underscoring added). Thus, with Yoshida, the result is that the listener believes that the

sound source is coming only from the front of the automobile (see Col. 4, lines 19-22).

In Applicants' invention, however, the sound is not delayed. It is generated from each

speaker at the same time. Yoshida does not disclose speakers having a specific vertical axis

or a specific horizontal axis. Yoshida discloses, in Fig. 2, three speakers mounted in the dash

of an automobile. A description as to the orientation of the speakers in the automobile is

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absent in the description.

In Yoshida, the speakers are located next to the front doors of the automobile. They

are neither tilted relative to the vertical axes nor positioned close to each other.

Claim 1 now recites that the

... L channel cone type speaker unit placed forward of a driver seat and a passenger seat of the automobile and immediately at

the left of the center speaker having:

a horizontal vibration axis in a direction pivoted

counterclockwise from a forward direction of motion of said

automobile, and

a vertical vibration axis directed at an incline of a prescribed angle in the direction of motion of said automobile

to intersect with and direct sound from a front glass of an

automobile...

in combination with

...an R channel cone type speaker unit placed forward of the driver seat and the passenger seat of the automobile and

immediately at the right of the center speaker having:

a horizontal vibration axis in a direction pivoted clockwise from the forward direction of motion of said

automobile, and

a vertical vibration axis at an incline of a prescribed angle in the direction of motion of said automobile to intersect

with and direct sound from a front glass of said automobile.

Yoshida neither discloses nor suggests the structure of left and right speakers located

immediately to the left and right of the center speaker and where the left and right speakers

are each oriented to have a horizontal vibration axes which is at an angle to the horizontal

plane and a vertical vibration axes which is at an angle to the vertical plane as is now recited

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in claim 1.

The Examiner states that Yoshida does not disclose a vertical axis at an incline of a prescribed angle in the direction of motion of said automobile to intersect with and direct sound form a front glass of the automobile. The Examine then states that Thigpen discloses a vertical vibration axis at an incline of a prescribed angle in the direction of motion of said automobile to intersect with and direct sound from a front glass of said automobile (Figs. 1, 2 and 9 and paragraph 26, lines 1-6). Thigpen discloses directional acoustic transducers as speakers. He does not disclose cone type speakers. Actually, Thigpen teaches that sound from a conventional cone type speaker which is reflected will sometimes result in a comb filtered frequency response curve to cause the cancellation of some frequencies. See paragraph [0027]. Thigpen states in the last sentence of paragraph [0027] that "With the present invention, most of the sound energy arrives from the reflective surface and at the same time, thus reducing comb filtering." Thus, Thigpen teaches that sound from a cone type speaker which is reflected from glass will result poor sound quality because some of the frequencies will be cancelled. Referring now to paragraph [0033]. Thigpen clearly states that "A conventional cone type speaker ... will not project a convincing acoustic image onto the glass because of the wide dispersion associated therewith". Clearly, Thigpen teaches that poor quality sound will result when sound from a cone type speaker is reflected from glass. Therefore, Thigpen teaches away from doing what Applicants are doing and claim as their invention, that of positioning a cone type speaker to reflect sound from the front glass of the automobile. Also, nowhere does Thigpen disclose of even suggest that his transducer is tilted relative to the vertical plane. It is only after the Examiner has read and understood Applicants

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invention that he has twisted the teaching of Thigpen to do what Thigpen strongly indicates

will not provide high quality sound with cone type speakers in his attempt to anticipate what

Applicants now recite in Claim 1.

In addition, in Thigpen, the acoustic transducers are positioned to be flat, not at an

angle as Applicants disclose and claim. See paragraph [0029] where Thigpen states that the

rectangular planar magnetic speakers are placed across the dash in end-to-end relationship

with the long axes thereof oriented perpendicular to the vehicle front listening position. In

paragraph [0030], Thigpen states that best separation will be obtained by positioning the

transducers perpendicular to the listener. Thus, Thigpen teaches away from reflecting sound

from a cone type speaker off glass- and tilting the speakers as Applicants disclose and

positively recite in claim 1.

Claim 1 now recites the structure of

A speaker apparatus for mounting in an automobile,

comprising:

a center cone type speaker located in the center of the

width direction of the automobile

an L channel <u>cone type</u> speaker unit placed forward of a driver seat and a passenger seat of the automobile and

immediately at the left of the center speaker having:

a horizontal vibration axis is in a direction pivoted counterclockwise from a forward direction of motion of said

automobile, and

a vertical vibration axis directed at an incline of a

prescribed angle in the direction of motion of said automobile to intersect with and direct sound from a front glass of an

automobile;

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an R channel cone type speaker unit placed forward of the driver seat and the passenger seat of the automobile and

immediately at the right of the center speaker having:

a horizontal vibration axis in a direction pivoted

clockwise from the forward direction of motion of said

automobile, and

a vertical vibration axis at an incline of a prescribed

angle in the direction of motion of said automobile to intersect

with and direct sound from a front glass of said automobile.

As noted above, neither Yoshida nor Thigpen, either separately or combined disclose

or suggest doing what Applicants disclose and now claim, that of having three cone type

speakers positioned near to each other where the left and right cone type speakers are each

inclined at two prescribed angles, one being relative to the vertical plane and the other being

angled relative to the horizontal plane. For the reasons noted above, claim 1 clearly avoids

the references cited and is believed to be in condition for allowance.

Π. Claim rejection-35 U.S.C. §103

The rejection of claims 2-3 and 5 under 35 U.S.C. § 103(a) as being unpatentable

over Yoshida et al., (U.S. Patent No. 5.854,847) in view of Thigpen (Pub. No.

2004/0109575) in further view of Yajima et al., (U.S. Patent No. 6,519,344) is traversed.

Claims 2-3 and 5 depend from claim 1 and, therefore, are considered to be in

condition for allowance.

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III. Claim rejection-35 U.S.C. §103

The rejection of claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida

et al., (U.S. Patent No. 5,854,847) in view of Thigpen (Pub. No. 2004/0109575) in further

view of Yajima et al., (U.S. Patent No. 6,519,344) in further view of Goldfarb (U.S. Patent

No. 5,764,777) is traversed.

Claim 4 depends from claim 1 and therefore, is considered to be in condition for

allowance.

IV. Claim rejection-35 U.S.C. §103

The rejection of claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida

et al., (U.S. Patent No. 5,854,847) in view of Yajima et al., (U.S. Patent No. 6,519,344) is

noted. Claim 6 is cancelled.

V. Claim rejection-35 U.S.C. §103

The rejection of claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida

et al., (U.S. Patent No. 5,854,847) in view of Yajima et al., (U.S. Patent No. 6,519,344) in

further view of Thigpen (Pub. No. 20040109575) is traversed. Claim 7 is amended to now

recite the structure of claim 6 in combination with the features of claim 1. For the reasons

noted above about claim 1, claim 7 also avoids the references applied. Therefore, it is our

understanding that claim 7 is in condition for allowance.

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CONCLUSION

Each and every point raised in the Office Action has been addressed on the basis of

the above amendments and remarks. In view of the above, each of the presently pending

claims in this application is believed to be in condition for allowance. Accordingly, the

Examiner is respectfully requested to pass this application to issue.

The Examiner is respectfully requested to contact the undersigned at the telephone

number indicated below if the Examiner believes any issue can be resolved through either a

Supplemental Response or an Examiner's Amendment.

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